

Ultra Low Power HFET Down Converter for Wireless Communication Applications

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An ultra low power GaAs HFET (heterojunction FET) amplifier/mixer MMIC was designed and characterized for portable communication applications in the 900 MHz band. A completely monolithic LNA (80 mil X 42 mil) achieved 10 dB gain, 2.5 dB NF and -4 dBm input IP3 at an operating current of 0.5mA @ 1.0 V. A down converter, consisting of the LNA and a dual gate FET mixer achieved -117 dBm receiver sensitivity in the 900 MHz cellular band. The total power consumption of this miniature down converter was about 2 mW. The HFET down converter IC achieved the same receiver sensitivity as a MESFET down converter at 1/5th of the power. The extremely low power dissipation, high third order intercept point, high level of integration, and very good RF performance of this monolithic IC make it an ideal candidate for wireless applications.

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